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| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
|---|-------------|----------------------|---------------------|-------------------|
| 10/518,453 | 07/12/2005 | Martine Mayne | 13777-37 | 7851 |
| 45473 | 7590 | 04/13/2010 | EXAMINER | |
| BRINKS, HOFER, GILSON & LIONE P.O. BOX 1340 MORRISVILLE, NC 27560 | | | | MCCRACKEN, DANIEL |
| ART UNIT | | PAPER NUMBER | | |
| 1793 | | | | |
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| 04/13/2010 | | PAPER | | |

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

| | | | |
|------------------------------|------------------------|---------------------|--|
| Office Action Summary | Application No. | Applicant(s) | |
| | 10/518,453 | MAYNE ET AL. | |
| | Examiner | Art Unit | |
| | DANIEL C. MCCRACKEN | 1793 | |

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1) Responsive to communication(s) filed on 29 December 2009.
 2a) This action is **FINAL**. 2b) This action is non-final.
 3) Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4) Claim(s) 1-45 is/are pending in the application.
 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
 5) Claim(s) 1-42 is/are allowed.
 6) Claim(s) 43 is/are rejected.
 7) Claim(s) 44 and 45 is/are objected to.
 8) Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9) The specification is objected to by the Examiner.
 10) The drawing(s) filed on 20 December 2004 is/are: a) accepted or b) objected to by the Examiner.
 Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
 Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
 11) The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12) Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
 a) All b) Some * c) None of:
 1. Certified copies of the priority documents have been received.
 2. Certified copies of the priority documents have been received in Application No. _____.
 3. Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

| | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ . |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____. | 6) <input type="checkbox"/> Other: _____ . |

DETAILED ACTION

Citation to the Specification will be in the following format: (S. # : ¶/L) where # denotes the page number and ¶/L denotes the paragraph number or line number. Citation to patent literature will be in the form (Inventor # : LL) where # is the column number and LL is the line number. Citation to the pre-grant publication literature will be in the following format (Inventor # : ¶) where # denotes the page number and ¶ denotes the paragraph number.

Status of Application

Applicants response dated 12/29/2009 has been received and will be entered. Claims 1-45 are pending. Claims 1-42 were previously indicated allowable. Claims 43-44 are amended. Claim 45 is new.

Response to Arguments

Claim Rejections – 35 U.S.C. §112

I. With respect to the rejection of Claims 43-44 under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention, Applicants' traversal is on the grounds that the rejection is obviated by the amendment. *See* (Remarks of 12/29/2009 at 8). This is persuasive and the rejection is WITHDRAWN. Applicants further state that "the scope of claims 43 and 44 has not been changed in any way by such conformational amendments." The Examiner respectfully disagrees. The amendments rearrange the components in the claims, and move an element (the "evaporation device") to a dependent claim. Removing an element from an

independent claim and adding it in a dependent claim is the definition of changing the scope of the claim.

Claim Rejections – 35 U.S.C. §102

I. With respect to the rejection of Claims 43-44 under 35 U.S.C. 102(b) as being anticipated by US 5,945,162 to Senateur, et al., Applicants' traversal is on several grounds, which is presented in a somewhat complicated manner. As an initial matter, the italicized and underlined passage at the bottom of page 9 of the remarks suggests, at least implicitly, that Applicants believe these claims are drafted in "means-plus-function" format as per 35 U.S.C. 112, ¶6 and require the requisite identity of function. *See* (Remarks of 12/29/2009 at 9) ("Given the foregoing, it is readily apparent that Senateur fails to disclose a device comprising a means for introducing said finely divided liquid particles into the reaction chamber with a carrier gas stream."). To the extent this was the argument being made, such argument is misplaced. Applicants have recited extensive structural components in Claim 43 (e.g. "injection head," "connection ring," and "gas intake component") that modify the "means for forming said liquid under pressure," *i.e.* language is recited that removes the "means for" limitation from treatment under 112, ¶6. *See* MPEP 2181 I. ("Thus, if the phrase "means for" or "step for" is modified by sufficient structure, material or acts for achieving the specified function, the USPTO will not apply 35 U.S.C. 112, sixth paragraph, until such modifying language is deleted from the claim limitation.").

With respect to the remaining arguments directed towards structural features, each is addressed in turn: Applicants traverse on the grounds that (1) "Senateur does not disclose any connection apparatus *between* the injector 14 and the deposition chamber 1." (Remarks of

12/29/2009 at 9) (emphasis added). This argument has been considered but is not persuasive. Claim 43 requires no connectivity between the reaction chamber and the periodic injection system. Claim 43 merely requires their presence. Applicants further traverse that (2) “Senateur does not disclose . . . any connection apparatus between the pipe 3 or introduction pipe 30 and the deposition chamber 1.” *Id.* Again, this argument appears to be directed at Claim 45. Claim 43 requires no such connectivity between the periodic injection system and the reaction chamber. Applicants further traverse that (3) “Senateur certainly does not disclose an injection system comprising an injection head and a connection ring that includes a carrier gas intake component, as required by amended claim 43.” *Id.* Applicants state “The injector 14 and pipe 3 and/or introduction pipe 30 of Senateur are separate from one another, thus it would be impossible for the liquid precursor 11 to be introduced into the deposition chamber 1 with or by the carrier gas, as required by amended claim 43.” Claim 43 has no such requirement. However, to the extent this argument can be interpreted as stating that Senateur does not teach the connection ring which includes the carrier gas intake component as required by the newly amended claims, this has been considered and is persuasive. The rejection is WITHDRAWN.

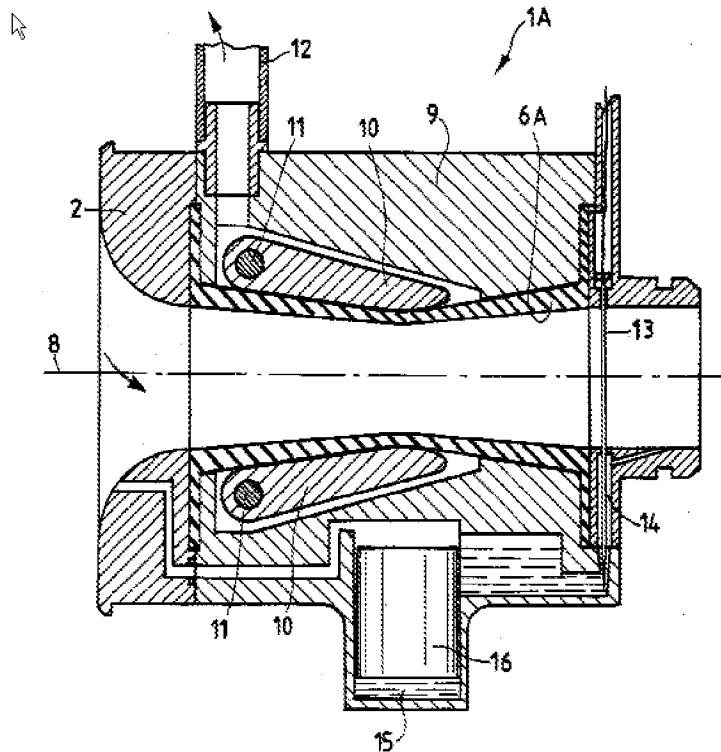
Claim Rejections – 35 U.S.C. §103

I. With respect to the rejection of Claims 43-44 under 35 U.S.C. 103(a) as being unpatentable over US 5,945,162 to Senateur, et al., the rejection is WITHDRAWN in light of the amendment and discussion above.

The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

I. Claim 43 is rejected under 35 U.S.C. 102(b) as being anticipated by US 5,662,086 to Piccinini.

With respect to Claim 43, this claim requires “a reaction chamber in which carbon nanotubes or nitrogen-doped carbon nanotubes are prepared by pyrolysis of a liquid containing at least one liquid hydrocarbon precursor of carbon or at least one liquid compound precursor of carbon and nitrogen consisting of carbon atoms, nitrogen atoms and optionally hydrogen atoms and/or atoms of other chemical elements, and optionally at least one metal compound precursor of a catalyst metal.” Note that apparatus claims are not limited by the material worked on. *See* MPEP 2115. As such, it is immaterial that Piccinini may not teach formation of carbon nanotubes or use of the particular reagents recited. All that is required of this portion of the claim is a chamber. A chamber is taught by Piccinini. *See e.g.* (Piccinini 3: 32; Fig. 1) (“intake duct (4)"). Alternatively, the cylinder of the engine can be interpreted as the chamber. Claim 43 further requires “means for forming said liquid under pressure into finely divided liquid particles, for conveying said finely divided particles by a carrier gas stream and for introducing said finely divided liquid particles into the reaction chamber wherein said means comprises a periodic injection system, said periodic injection system comprises an injection head and a connection ring, said connection ring includes a carrier gas intake component.” Piccinini teaches a periodic injection system. (Piccinini 3: 61 *et seq.*, “Fig. 2”).



Piccinini teaches structure that can be interpreted as a connection ring, a gas intake component and an injection head. Note that this is a cross sectional view, but an annular or circular arrangement is reasonably suggested. *See e.g.* (Piccinini "Fig. 9"). The housing that contains delivery nozzle 14 can be construed as the connection ring. The portion to the right of the delivery nozzle can be construed as the injection head. The delivery nozzle 14 can be construed as the carrier gas intake component.

Allowable Subject Matter

Claims 1-42 are allowed.

Claims 44-45 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims. The search of the prior art did not uncover a periodic injection

system with the groove and placement of the groove as recited in Claim 44. Similarly, the arrangement of an evaporation device as required by Claim 45 was not taught in the prior art.

Conclusion

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to DANIEL C. MCCRACKEN whose telephone number is (571)272-6537. The examiner can normally be reached on Monday through Friday, 9 AM - 6 PM EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Stanley S. Silverman can be reached on (571) 272-1358. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Daniel C. McCracken/
Daniel C. McCracken
Examiner, Art Unit 1793
DCM

/Steven Bos/
Primary Examiner, Art Unit 1793